

15.50 A YEAR

May 6, 1961

VOL. 29, NO. 18 PAGES 273-286

SCIENCE NEWS LETTER

RECEIVED
MAY 9 - 1961
DANIEL UNIVERSITY

THE WEEKLY SUMMARY OF CURRENT SCIENCE



Weightless Testing

See page 285

MIAMI UNIV LIBRARY
OXFORD OHIO
PERIODICAL RECORD
DEC 61 944-127 2A 4

A SCIENCE SERVICE PUBLICATION

WATCH THIS SPACE

In a moment a new satellite will streak into view. Bell Laboratories may help guide it into orbit, for few are so eminently qualified in the science of missile guidance. Bell Laboratories' Command Guidance System has guided such trailblazers as Tiros and Echo into precise orbits. The same system will guide more new satellites into predetermined orbits as Bell Laboratories continues pioneering in outer space to improve communications on earth.



BELL TELEPHONE LABORATORIES

World center of communications research and development

t
K
w
c
to
p
n
L
of
A
to
po
ca
su
m
cig
no
sai
foe
ber
bil
J
gin
car
niz
7,1
T
wer
dis
ma
bec
"
men
ther
nan
of p
men
H
the
occu
gest
cano
Ha
► T
as a
coun
A
nomi
the s
outp
Dani
porte
meet
Sol
count
are n
to tap
Defin
search

MEDICINE

Animal Cancer Cured

Breast cancer in rats has been cured with hormone treatment. One dose of a cancer-producing chemical in food produced cancer, the National Academy of Sciences was told.

► **EARLY TREATMENT** of breast cancer with certain types of female hormones has cured the cancer in some 200 rats. But it took only a single meal of a cancer-producing chemical to produce the malignancy.

Dr. Charles Huggins of the Ben May Laboratory for Cancer Research, University of Chicago, reported to the National Academy of Sciences meeting in Washington, D. C., that a single feeding of certain polynuclear hydrocarbons produced breast cancer in healthy female rats.

This raises the question of human consumption of harmful hydrocarbons such as may exist in food, air, the benzpyrene of cigarettes and other substances.

Although his laboratory experiments do not relate directly to humans, Dr. Huggins said that a systematic study of foods and food additives needs to be done. The cranberry scare was only one of many possibilities of danger.

In his laboratory experiments, Dr. Huggins said that ten hydrocarbons with special cancer-causing property have been recognized but that the one most effective was 7,12-dimethyl-benz(a)anthracene, or DMBA.

To produce the cancer, 50-day-old rats were given 20 milligrams of the DMBA, dissolved in oil, by mouth. Cancer of the mammary glands appeared in two weeks, becoming first visible in 20 days.

"It is possible to accelerate the development of the breast cancers or to suppress them entirely," Dr. Huggins said. "Pregnancy, at age 65 days, or the administration of progesterone solo enhances the development."

However, if the rats were given one of the several estradiols, or female hormones, occurring in the body, along with progesterone, another female hormone, the cancer was cured—extinguished entirely.

• Science News Letter, 79:275 May 6, 1961

Harness Sun's Energies

► **THE SUN'S ENERGY** will be harnessed as a source of power for underdeveloped countries.

A need for new energy sources for economically backward countries has focused the spotlight on using the sun's tremendous outpouring of energy, Dr. Farrington Daniels of the University of Wisconsin reported to the National Academy of Sciences meeting in Washington, D. C.

Solar energy is within the reach of smaller countries because large amounts of money are not needed to conduct research on ways to tap the sun's energy, Dr. Daniels stated. Definite breakthroughs in solar energy research are already paving the way for

eventual full-scale practical use of the sun's energy.

Solar energy will soon be de-salting the oceans, powering satellites through space, heating homes and cooking meals. Some cooking units are already being used in Florida and solar fuel cells have helped keep the Vanguard I satellite broadcasting for three years.

New materials for utilizing the sun's rays were developed recently, Dr. Daniels said. Plastics that last for years are making solar units more efficient and new semiconductors are transmitting the sun's heat rays much better.

Although the United States and other highly industrialized areas will not have to rely largely on solar energy for quite some time, Dr. Daniels believes they will eventually run out of fuel and will turn to the sun as their energy source.

• Science News Letter, 79:275 May 6, 1961

Power From the Ocean

► **OCEAN BOTTOM** sediments and sea water might soon be used as a source of electric power.

U.S. Geological Survey scientist, Dr. Frederick D. Sisler, has developed an "organic" fuel cell that produces electrical energy directly from decomposing organic matter. The electricity is generated by bacteria "burning" the organic matter.

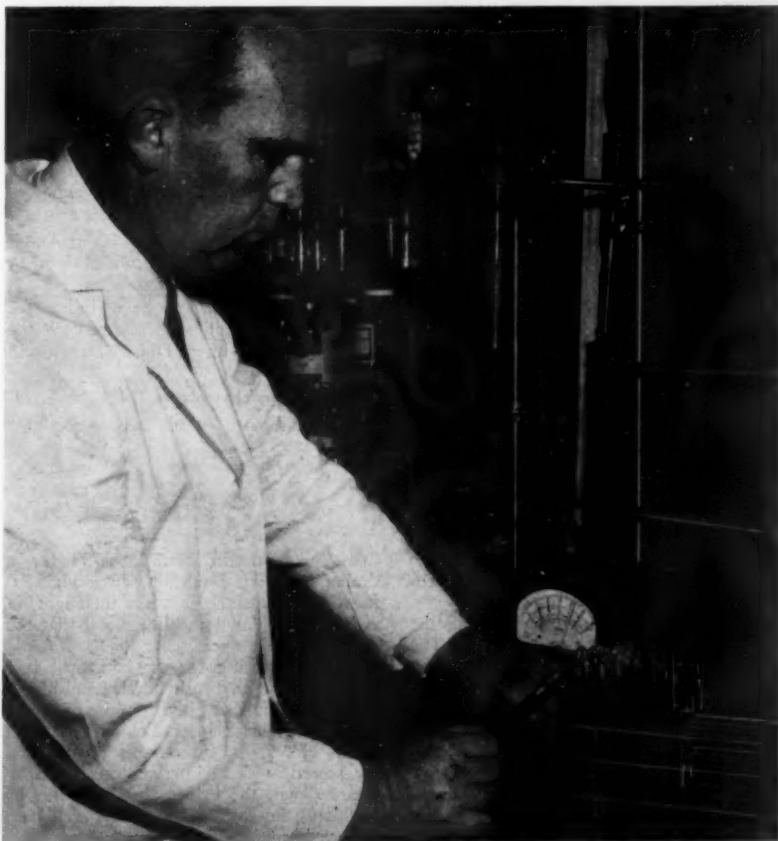
The fuel cell was exhibited by Dr. Sisler at the National Academy of Sciences meeting in Washington, D. C.

The biochemical fuel cell is divided into two compartments, one containing sea water, organisms and bacteria; the other sea water and oxygen. An electrode is dunked in each unit, and the resulting energy formed from the "burning" organisms is converted to electricity.

An inexpensive supply of both oxygen and organic matter for fuel can be obtained by using live algae, Dr. Sisler said. Such a cell could possibly produce electricity indefinitely from solar energy alone. It could be adapted for use in outer space.

Other virtually useless organic material such as sewage could be used as fuel. Many millions of dollars are now being spent to treat sewage when it is a potential energy source, Dr. Sisler stated.

• Science News Letter, 79:275 May 6, 1961



BIOCHEMICAL FUEL CELLS—Shown by Dr. Frederick D. Sisler

BIOLOGY

Sees Hereditary Material

►THE FIRST scientist to see a gene express itself in a test tube believes his work may enable biologists to explore more closely the chemical intimacy of heredity and has definite plans for doing some exploring of his own.

In describing his recent accomplishment to SCIENCE SERVICE before his address to the National Academy of Sciences spring meeting in Washington, D. C., Dr. G. David Novelli, biochemist at the Oak Ridge National Laboratory in Tennessee, said:

"We weren't the first to synthesize protein outside the cell, but we were the first to achieve specific gene action in a test tube."

Biologists generally agree that the transfer of genetic information is the work of deoxyribonucleic acid (DNA), the compound that makes up the chromosomes that carry genes. Genes, the heredity units that control traits as varied as finger length and disease resistance, are thought to exert their influence by dictating the synthesis of enzymes.

Dr. Novelli was able to duplicate the synthesis of such an enzyme, beta-galactosidase, in the test tube and to directly implicate a specific kind of DNA in the protein forming process. The organism used was the intestinal bacterium, *Escherichia coli*.

Only a small part of the DNA molecule controls the formation of beta-galactosidase; the other parts do other things. Dr. Novelli and his group broke open *E. coli* cells and separated the protein making machinery. They found that only the DNA isolated from the organism caused the formation of the enzyme—and only that enzyme—out of the metabolic soup.

Destroying the DNA with ultraviolet rays, X-rays and a DNA-splitting enzyme called DNase completely jammed the beta-galactosidase making machinery. None was formed.

Further—and this was a crucial experiment—when he added the DNA taken

from mutants of *E. coli* which did not have the ability to make the enzyme, again none was formed.

"The new development in our work is that we now know that DNA has to come from cells that have the specific gene to form the specific protein," Dr. Novelli said.

Where does he go from here? In several directions, the New England-bred biochemist said.

"For one thing, nobody knows how big a gene is. Now we can begin to chop up DNA to see how small a particle will work. Then we will determine the base composition."

The bases—four in all—are believed to be the portions of the DNA molecule which determine the character of genetic information the DNA molecule transmits. They are scattered repeatedly but systematically along the molecule. Biologists would like to relate the pattern—the code—of these bases to the kind of traits they dictate.

"Another big job is to determine the character of a substance called messenger RNA, the template on which protein is probably built," said Dr. Novelli.

RNA is first cousin of DNA. It is the abbreviation of ribonucleic acid. The two nucleic acids somehow work together as a team in protein synthesis. DNA gives the information to messenger RNA in the form of molecular code—probably by arranging the bases—then the RNA travels to the site of protein synthesis where some 20 different components of the protein molecule, the amino acids, begin arranging themselves on the template.

Then, when the protein is made, it strips itself off the RNA, which is then ready to resume the cyclic process.

"So another job would be to isolate the messenger RNA and see if we can get the process to work without DNA," Dr. Novelli said.

• Science News Letter, 79:276 May 6, 1961

hand-powered swing. It is actually a small airplane suspended by wooden or metal bars.

The child sits in the cockpit of the plane with the stick of the airplane between his knees. Pushing and pulling on the stick, which is connected to the leverage arrangement, makes the plane swing back and forth. This device was awarded patent No. 2,980,164 with rights partially assigned to Edgar A. Gittinger Jr., also of San Antonio.

The family cat or dog gets an added bit of sleeping comfort, in the form of a cot with an electrically heated pad, patent No. 2,980,058. The structure, invented by Roy D. Hoffman of Bedford, Pa., provides pipe-like supports for a standard cot arrangement. The cloth part is actually a heating pad equipped with a washable cover.

• Science News Letter, 79:276 May 6, 1961

SCIENCE NEWS LETTER

VOL. 79 May 6, 1961 NO. 18

Edited by WATSON DAVIS

The Weekly Summary of Current Science, published every Saturday by SCIENCE SERVICE, Inc., 1719 N. St., N.W., Washington 6, D. C., North 7-2255. Cable Address: SCIENCE-SERV.

Subscription rates: 1 yr., \$5.50; 2 yrs., \$10.00; 3 yrs., \$14.50; 5 or more copies in one package to one address, 7½ cents per copy per week; single copy, 15 cents, more than six months old, 25 cents. No charge for foreign postage.

Change of address: Three weeks notice is required. When ordering a change please state exactly how magazine is addressed. Your new address should include postal zone number if you have one.

Copyright © 1961 by Science Service, Inc. Reproduction of any portion of SCIENCE NEWS LETTER is strictly prohibited. Newspapers, magazines and other publications are invited to avail themselves of the numerous syndicated services issued by Science Service. Science Service also publishes CHEMISTRY (eight times a year) and THINGS of science (monthly).

Printed in U.S.A. Second class postage paid at Washington, D. C. Established in mimeograph form March 13, 1922. Title registered as trademark, U. S. and Canadian Patent Offices. Indexed in Reader's Guide to Periodical Literature, Abridged Guide, and the Engineering Index. Member Audit Bureau of Circulation.

SCIENCE SERVICE

The Institution for the Popularization of Science organized 1921 as a non-profit corporation.

Board of Trustees—Nominated by the American Association for the Advancement of Science: William W. Rubey, University of California at Los Angeles; Wallace R. Brode; Douglas Whitaker, Rockefeller Institute for Medical Research. Nominated by the National Academy of Sciences: Harlow Shapley, Harvard College Observatory; Philip Bard, Johns Hopkins University; Henry Allen Moser, John Simon Guggenheim Memorial Foundation. Nominated by the National Research Council: Leonard Carmichael, Smithsonian Institution; John R. Dunning, Columbia University; Benjamin H. Waller, Johns Hopkins University. Nominated by the Journalistic Profession: Michael J. O'Grady, Providence Journal-Bulletin; O. W. Riegel, Washington and Lee University; Ralph B. Curry, Flint Journal. Nominated by the Scripps Estate: Edward J. Meeman, Memphis Press-Scimitar; Frank Ford, Washington, D. C.; Charles E. Scripps, Cincinnati, Ohio.

Officers—President, Leonard Carmichael; Vice President and Chairman of Executive Committee, Charles E. Scripps; Treasurer, Wallace R. Brode; Secretary, Watson Davis.

Staff—Director, Watson Davis. Writers: Gloria Ball, Ann Ewing, Faye Marley, Vincent Martels, Jane Marye, Tave Neville, Marjorie Van de Water, Judy Wark, Burrell Wood. Science Youth Division: Joseph H. Krouse, Shirley Moore, Doris Schriver, Leslie Watkins. Photography: Fremont Davis. Production: Priscilla Howe, Marcia Nelson. Syndicate Sales: Hallie Jenkins. Librarian: Margit Friedrich. Interlingua Division in New York: Alexander Gode, 80 E. 11th St., Glenside 3-5410. Advertising Manager: Fred A. Moulton, Metropolitan 8-2562.

INVENTIONS

Patents of the Week

►"INVENTIONS for the home of tomorrow" were the theme of several inventions just patented.

Two improved methods for rocking the cradle electrically have been invented. The main advantage of the "motor driven cradle" devised by David Saint of Rockledge, Pa., and Calvin L. Reed of Jenkintown, Pa., and assigned to Graco Metal Products, Inc., is that it can be made inexpensively.

It also has a timer and an adjustment that lets the cradle rock through a wide arc or a small one. Patent No. 2,979,734 was awarded this invention.

Norman Donald Helmer of Long Beach,

Calif., won patent No. 2,979,735 for a similar idea. His invention, a rocking platform for a bassinet, is lower in height, in order to cut down the likelihood that the device will tip over.

The latest thing for the bathroom is a bar of soap with brush bristles embedded. The scrubbing bar, invented by Guy M. Beatty of Bakersfield, Calif., and awarded patent No. 2,979,748 contains bristles that are scored at short intervals. As the soap wears down, the bristles break off bit by bit along the score marks and a scrubbing surface is maintained.

For the child in the family, Homer C. McNeil of San Antonio, Tex., has devised a

BACTERIOLOGY

Cancer Chemicals in Smog

► A TECHNIQUE for detecting cancer-producing chemicals will be applied to "smog" compounds that pollute air.

Carcinogenic (cancer-producing) properties of almost infinitesimal quantities of chemical compounds can be determined in a matter of only two days.

The technique was reported at the American Society for Microbiology meeting in Chicago by Dr. William D. Won, assistant research bacteriologist, University of California, Berkeley, who with Dr. Jerome F. Thomas, associate professor of sanitary engineering, found evidence of structural and biochemical changes in bacteria grown in the presence of known carcinogens. No change was seen when the experiments were repeated with non-carcinogens.

The bacterial technique will be applied to the study of atmospheric pollutants. More than 100 organic compounds have been separated in pure form from smog, but less than 20% of these have been classified as to their carcinogenic properties. This is because only millionths of a gram of these compounds are now available.

Present methods of checking for carcinogenic activity by feeding or application to the skin of laboratory animals require at least 20 thousandths of a gram per animal and a minimum of six months before results are obtained. The bacterial method requires only millionths of a gram.

The scientists chose four hydrocarbon compounds present in polluted air to test the new technique. Two of them were known carcinogens, while the other two were known to be non-carcinogenic.

Bacteria grown in the presence of the carcinogens showed the development of giant cells, granular cells, and an increase in fatty acid content. Bacteria grown with the non-carcinogens showed no change in these characteristics.

Other changes apparently resulting from the carcinogens included significant increases in enzyme activity and lactic acid production by the cells. Small increases in these two factors were also noted in those cells exposed to non-carcinogens.

All of the changes found in the bacteria exposed to the carcinogens are characteristic of malignant cells in higher animals.

The bacterium used in the experiments is known as "*Bacillus megatherium*." Several different species were studied before this type was found to be most highly sensitive to the presence of carcinogens.

Bacterial technique can be used to rule out many unidentified compounds as harmless. Those that caused changes in the bacteria could then be obtained in greater amounts for chemical identification and tests with animals.

• Science News Letter, 79:277 May 6, 1961

Penicillin Effect

► SCIENTISTS have found one reason why mysterious infections that seem to be

cured by antibiotics flare up again when treatment is stopped, the American Society for Microbiology was told in Chicago.

Herbert Ginoza and Dr. Otto E. Landman of the U. S. Army's Biological Laboratories, Fort Detrick, Frederick, Md., found, as have other investigators, that penicillin often converts rigid, rod-shaped bacteria into soft round bodies rather than killing them. If only a small amount of penicillin is used, the round bodies become bacteria again once the drug is removed, but if a sizable dose is given, the inheritance of all the bacteria is changed and they remain in the round-body stage permanently.

Going a step further, the Fort Detrick scientists offer an explanation for this phenomenon. Penicillin, they believe, damages the bacteria in two ways. First, it prevents them from making the cell wall that holds the soft living mass of the bacteria together. Secondly, penicillin also prevents the bacteria from dividing in the normal fashion.

Under the right conditions, however, the changed bacteria, called "L-forms," can grow well and resist penicillin and other drugs.

This may explain the flare-up of the bacteria, the scientists reported, after termination of treatment.

• Science News Letter, 79:277 May 6, 1961

Staph in Gonorrhea

► IN CASES of "penicillin-resistant" gonorrhea, a particularly tough staphylococcus organism, rather than the gonococcus organism itself, is the biggest resistance factor, scientists attending the annual meeting of the American Society for Microbiology learned in Chicago.

Col. Arvey C. Sanders of the Walter Reed Army Institute of Research, Washington, D. C., reported that among U. S. troops on duty in Korea and Japan many with gonorrhea were found to carry large numbers of staphylococci along with the gonococcus. Studies showed, he said, that the gonococcus, when grown with the staph, could thrive in concentrations of penicillin that otherwise would have destroyed it.

The staph species involved is not the same one that has plagued hospitals for years. The one that worries hospital administrators is *Staphylococcus aureus*; the gonorrhea-associated species is *Staphylococcus epidermidis*, which, by itself, causes little or no trouble.

S. epidermidis, Col. Sanders reported, produces staphylococcal penicillinase, a substance that breaks down penicillin. This alone makes things easier for the gonococcus. But, in addition, the staph organism is stimulated by penicillin—the more penicillin there is the more the staph breaks it down, because the organism is producing more penicillinase.

The staph organism also produces other substances, as yet unidentified, that help the

gonococcus grow. In some way they "contribute to the continued nutrition" of the disease bacterium.

Working with Col. Sanders were Dr. Michael J. Pelczar of the University of Maryland, College Park, and Dr. Adam F. Hoeffling of the 406th Medical General Laboratory in Tokyo, Japan.

• Science News Letter, 79:277 May 6, 1961



SURVIVAL SUIT—Rocket fuel banders are protected from splash, spray or fumes of high energy rocket propellants with suit developed by the Firewel Company, Buffalo, N. Y. Similar suits could be used in civil defense.

HORTICULTURE

New Kit Grows Plants Without Soil

► EVEN THE RANKEST amateur or a landless apartment dweller can grow plants without soil using a new inexpensive science kit.

The Soilless Gardening unit of THINGS of science just issued by SCIENCE SERVICE, provides seeds, plant food and directions for planting and growing carrots, sweet peppers, snapdragons and petunias. The 16 experiments described in the unit provide an introduction to the science of hydroponics. Following these directions, anyone can have a little "farm" anywhere and anytime regardless of the weather.

The plant food furnished in this kit provides the needed "trace" elements in addition to the usual potash, phosphate, nitrogen, calcium, magnesium and iron. It is in a convenient water-soluble form that makes the feeding of plants simple.

The soilless gardening unit (No. 244) is available for 75¢ each or three for \$1.50 by writing to THINGS of science, SCIENCE SERVICE, 1719 N. St., N.W., Washington 6, D. C. Membership in THINGS of science is available at \$5.00 for 12 monthly units.

• Science News Letter, 79:277 May 6, 1961

GEOPHYSICS

Earth Drill Proposed

► AN "ATOMIC DRILL" that melts its way into the earth's interior was proposed at the American Geophysical Union meeting in Washington, D. C.

A needle-like drill housing a high-temperature nuclear reactor core would actually melt through the rock layers it passes, Dr. W. Mansfield Adams of the University of California's Lawrence Radiation Laboratory, in Livermore, said. The drill would be used to study the deeper layers of the earth's crust and the dense mantle surrounding the core of the earth.

The searing-hot, 2,000 degrees Fahrenheit core would alternately melt the rock and then fall through the resulting molten material, Dr. Adams said.

Ceramic "bottles" were proposed for collecting molten rock samples at various depths. The "bottles" are plugged by rods that wear away at different rates, thereby collecting the samples periodically as the core melts its way down through the crust.

Later the core would release some weights and the drill would float back to the surface.

The project seems quite feasible, Dr. Adams said, but no estimate of the cost is available. The United States is already working on another drill that will penetrate the earth's crust, but it is mostly a refined method of present conventional drilling.

• Science News Letter, 79:278 May 6, 1961

Ocean Circulation

► VERTICAL circulation of ocean waters near the ocean surface is helping to feed the fishes of the sea.

U.S. Navy scientists have measured distinct sinking and upwelling of water masses near the surface for the first time, Dr. Eugene C. LaFond of the Navy's Electronics Laboratory in San Diego, Calif., reported. The currents could continually bring up food from the depths for the surface marine life and also take down the surface food, such as plankton, for the larger fish in the deeper depths.

The currents are formed by relatively large waves that are found where cold deeper layers meet the warmer surface layers. These "internal waves" create vertical currents as they roll along, Dr. LaFond told the American Geophysical Union meeting in Washington, D. C.

Knowledge of these currents is very desirable for underwater missile launching, submarine movement and the distribution of food for marine life, Dr. LaFond said. Television and movie cameras were used to spot the currents. The equipment was housed in a car suspended from a tower, one mile off the California coast.

Similar investigations in the Atlantic Ocean, Indian Ocean and the Gulf of Mexico strongly indicate that the vertical current movement is world-wide, Dr. LaFond stated.

The origin of the "internal waves" is still a mystery. Some scientists believe storms far out at sea start the waves, others think they are due to cold and warm layers meeting.

• Science News Letter, 79:278 May 6, 1961

Dust Layer Around Earth

► A DENSE LAYER of cosmic dust is orbiting around the earth, Dr. S. F. Singer, a University of Maryland physicist, said.

The dust layer reaches a peak concentration about 600 miles above the earth's surface, Dr. Singer suggested at the American Geophysical Union meeting in Washington, D. C.

Cosmic dust floating near the earth is pulled toward the earth by its gravity. The dust particles go into orbit when the pull of gravity balances the tendency of the dust particles to escape from the earth's influence.

The density of the layer probably becomes greater than that of the earth's atmosphere about 1,800 miles out in space, Dr. Singer said. It could become as much as 60 times denser than the earth's covering of air.

Although most particles are influenced primarily by the earth's pull of gravity, the smaller particles are also affected by the earth's magnetic field and the sun's radiation, the scientist said.

• Science News Letter, 79:278 May 6, 1961

ASTRONOMY

Metallic "Meteorites" Found in Tektites

► TINY "meteorites" found in tektites strongly indicate the material came from outer space.

Tiny metallic spheres or meteoric material were discovered for the first time in a tektite from the Philippines, Dr. E. C. T. Chao of the U.S. Geological Survey reported. Tektite is a natural glass of unknown origin.

Dr. Chao strongly believes the tektite came from the moon. The glass was probably formed when a meteorite smashing into the moon sent a spray of small liquid particles that cooled into a glass.

The silvery metallic spheres contained approximately the same amount of nickel and iron as found in a meteorite, Dr. Chao said. Other properties of the glass rule out the possibility that it formed on the earth. Some scientists believe tektites result from comets or meteorites striking the earth.

"The discovery of the metallic spheres provides the strongest evidence thus far that tektites came from outer space," Dr. Chao said. More research, currently taking place in the U.S. Geological Survey laboratories, is needed before it is definitely proved. The tektite he studied was 500,000 to 600,000 years old.

• Science News Letter, 79:278 May 6, 1961

Source of Auroras

► THE BRIGHT "northern lights," or auroras, are caused by electrically charged particles leaking into the atmosphere from the Van Allen radiation belts.

Extra electrons and protons are created in the earth's magnetic field when there is an eruption on the sun, Dr. John W. Kern of Rand Corporation, Santa Monica, Calif., told the American Geophysical Union meeting in Washington. The charged particles are dumped into the earth's atmosphere, creating a display that lights up the northern sky.

A solar flare on the sun sends a steady flow of ions hurtling toward the earth that distorts the magnetic field. Electrons and protons in the magnetic field separate and drift away from each other, creating charged particles. The particles then take turns drifting toward the outer Van Allen radiation belt where they are finally dropped into the earth's atmosphere near the North Pole.

• Science News Letter, 79:278 May 6, 1961

ROCKETS AND MISSILES

Missiles in Future Could Fight Fires

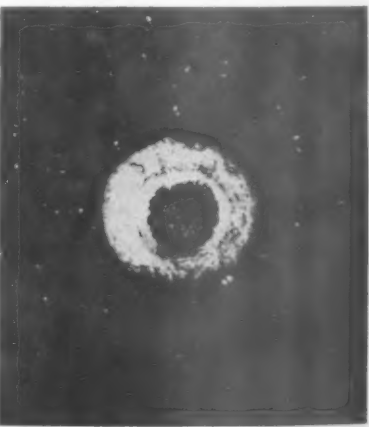
► MISSILES could help fight forest fires of the future.

This is the idea of Dr. George M. Jemison, deputy assistant chief of research for the U.S. Forest Service. Missiles on pads, placed in strategic locations throughout forest areas, might be used to control fires until ground crews could arrive on the scene.

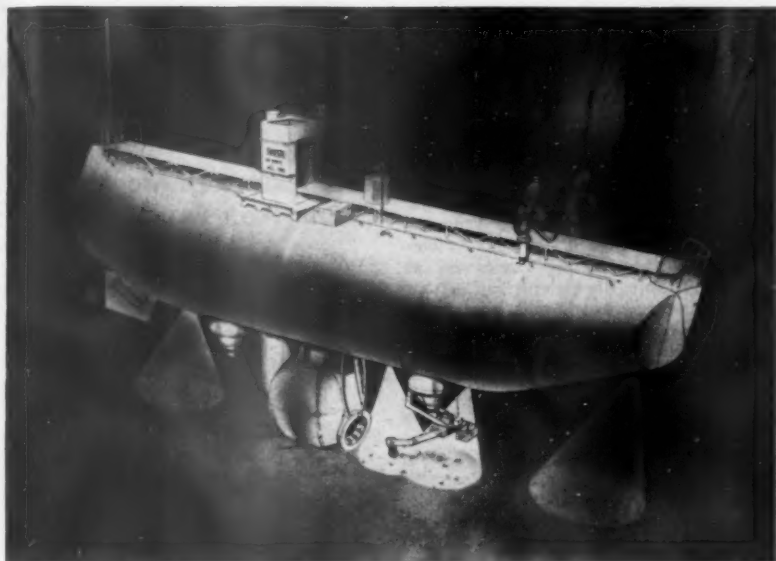
Missiles would be filled with fire-retardant chemicals and would be guided to the fire by heat-sensing nose cones. They would be detonated with proximity fuses at predetermined heights above the fire.

The size of the fire would determine the number of such missiles to be launched simultaneously. Meanwhile, ground crews would be going to the fire area by helicopters and landing at heliports scattered throughout the forest.

• Science News Letter, 79:278 May 6, 1961



"METEORITE" IN TEKITE



REACH IN THE DEEP—The U. S. Navy's deep sea bathyscaphe Trieste has been equipped with a mechanical arm for picking up samples of material from the ocean floor. Oceanographers can control the arm, built by General Mills, Inc., Minneapolis, Minn., from the sphere beneath the craft.

PHYSICS

Missile Radio Trouble

► **DIFFICULTIES** with radio and radar in high-flying missiles caused by gases (plasma) may soon be over.

The plasma forming on the missile's skin often behaves unpredictably because the missile's high speed causes large numbers of electrical particles to move very rapidly.

New theoretical work shows that if certain low-frequency ion waves are created in the plasma, very high frequency radio and radar signals would be able to go through the plasma and make communication possible.

If the theory proves correct, the low-frequency waves could be used in the Dyna-Soar manned space glider program as well as for other space craft. Dr. J. E. Drummond, Boeing Scientific Research Laboratories, told the American Physical Society meeting in Washington, D. C.

Other new developments in plasma physics include the achievement of a stable plasma for one-thousandth of a second in a machine for testing plasma called Toy Top III. This device consisting of a 40-foot tube in two stages produced dense plasma of temperatures of about 72 million degrees Fahrenheit, Dr. F. Coensgen, Lawrence Radiation Laboratory, Livermore, Calif., reported.

If the problems of instability of plasma can be overcome and applied practically, the result would be controlled thermonuclear reactors, a new source of power.

Dr. R. F. Post, also of Lawrence Radiation Laboratory, said that by 1965 the problem of instability will be settled one way or the other, as far as the magnetic mirror

machine he is working with is concerned.

He said work done with instabilities in thermonuclear reactors may some day help explain astrophysical instabilities in the sun in the same manner that laboratory work helped explain the Van Allen radiation belts that surround the earth.

• Science News Letter, 79:279 May 6, 1961

Cool Atom Smasher

► **A COOL** "atom smasher" operating at temperatures more than 400 degrees below zero Fahrenheit was foreseen as a means of reducing initial cost and upkeep on these expensive machines.

Dr. Cyril D. Curtis of Midwestern Universities Research Association, Madison, Wis., said the large magnets used in atom accelerators might be made of such superconducting materials as the niobium-tin alloy recently developed at Bell Telephone Laboratories.

Doing this would considerably reduce the size of the magnets required to achieve a specific energy for the particles being accelerated in the machine, he told the American Physical Society meeting in Washington, D. C.

One study showed that using magnets made of sodium and operated at a temperature of 432 degrees below zero Fahrenheit would cut costs of construction and power by 35%, or \$85,000,000. With magnet rings having diameters of up to 800 feet, machines now under construction may cost up to a hundred million dollars or more.

• Science News Letter, 79:279 May 6, 1961

OCEANOGRAPHY

French Ship to Explore South Atlantic Sea Life

► **THE FRENCH** oceanographic ship Calypso will leave for South America this September to explore the Atlantic ridge with photographic equipment and survey the sea life along the coast of the South Atlantic, its captain, Jacques-Yves Cousteau, said. Capt. Cousteau is director-general of the oceanarium of Monaco.

In 1956, he led an expedition to survey the biological life in the water along the African coast at the same latitude as the area to be surveyed in the South Atlantic. And in 1959, the fauna along the island in the center of the Atlantic at this latitude were studied.

"The importance of the coming investigation of the ocean life along the coast of the South Atlantic is that it will provide a clear view of the exchange and development of fauna and, perhaps, shed some new light on why some specimens are common to all the explored areas. We will be able to see the links," Capt. Cousteau said.

Capt. Cousteau was in Washington, D. C., to receive the National Geographic Society's gold medal for oceanic research.

• Science News Letter, 79:279 May 6, 1961

Find Rare Hydrogen

► **THE RARE** form of hydrogen known as tritium, an ingredient of hydrogen bombs, is formed in the sun during a flare, which is a tremendous outpouring of solar material.

The fact that tritium is produced by the sun was found for the first time by scientists when they examined the remains of a Discoverer satellite (No. 17) that was exposed to the full fury of the solar storm on Nov. 12, 1960.

"Because of its exceptional scientific importance," the satellite has been carved up and its pieces distributed to various laboratories for further study, Dr. Herman Yagoda of the Air Force Cambridge Research Laboratories, Bedford, Mass., said.

The sun also produces large quantities of carbon, oxygen, magnesium and iron nuclei during a flare, Dr. Yagoda told the American Physical Society meeting in Washington, D. C. These particles have sufficient energy to penetrate the satellite's skin, and are "especially effective in producing biological change," Dr. Yagoda said. This further complicates the shielding requirements for man in space if the launching should occur at the time of a solar flare, the sudden occurrence of which is not yet predictable.

The Discoverer 17 satellite carried a nuclear emulsion block in which tracks of the tritium, carbon, oxygen, magnesium and iron were found.

"Unlike the sparse rain of galactic cosmic radiation," Dr. Yagoda said, "when a flare occurs, the sun envelops the earth in an intense radiation field." This radiation is soft, however, and does not penetrate deeply into the atmosphere.

• Science News Letter, 79:279 May 6, 1961

MEDICINE

X-Ray Movies Help Deaf Speak Properly

► THE DEAF are being helped to speak properly through the use of X-ray movies showing the speech mechanism in action.

New filmed procedures, known as cine-fluorography, have been developed by a speech therapy team at the University of California, Los Angeles Medical Center for this purpose. The team consists of Dr. Franklin L. Ashley, Robert F. Sloan, and Drs. Howard A. Grey, Elise Hahn and John Miethke.

The speech mechanism of the subject is coated with vanilla-flavored, radio-opaque barium, and X-ray movies are then made as the subject utters basic speech components, known as phonemes, as well as words and phrases. Thus the various parts of the speech mechanism, such as the tongue, soft palate, etc., are visualized in action.

The film is designed to help the teacher and pupil actually to see what goes on in the mouth and throat during speech. Diagrams and still X-ray photos have been inadequate for the purpose. Motion pictures, it is believed, will help the individual to visualize better a particular combination of articulatory positions in the proper sequence and duration necessary for a smooth speech flow.

The film is used with those born deaf and those whose speech is deteriorating as a result of hearing loss in later life. Both groups are handicapped by absence of the hearing sense, which is the chief speech monitor.

Films have been made for both English- and Spanish-speaking groups and demonstrated in this country and in Mexico.

• Science News Letter, 79:280 May 6, 1961

IMMUNOLOGY

Mass Revaccination Program in USSR

► COMPLETE eradication of polio in the USSR is the aim of current plans for the mass revaccination of Russians under 20 with the Sabin oral live virus vaccine.

Dr. Albert B. Sabin of Cincinnati, who developed the vaccine, reports in the *Journal of the American Medical Association*, 176:231, 1961, that 77,475,000 persons were vaccinated during 1960 in the USSR.

Of this number, 72,231,000 were under 21 years of age, and the remainder were 21 to 55 years old. The mass inoculation of the younger group was usually accomplished in one to seven days. Most of the population was inoculated before July 1, thus preventing the traditional summer increase in the disease.

Referring to the 1960 community immunization program in Cincinnati, in which the Sabin vaccine was used for children in schools and others in doctors' offices, Dr. Sabin states that conditions in the Cincinnati program made revaccination unnecessary.

Prof. M. P. Chumakov, director of the Moscow Institute for Poliomyelitis Research

of the USSR Academy of Medical Sciences, indicated that his recommendation for revaccination this year in the USSR is based on the desire to do even more than may be necessary to achieve complete eradication of polio.

"I have not seen any data that indicate a need for it," Dr. Sabin says.

Prof. Chumakov reported that although Salk killed vaccine was used in three regions of the Russian Soviet Federated Socialist Republic (RSFSR) with a consequent lowering of polio cases on an average of four times less than among children not vaccinated, the Salk vaccine did not prevent the seasonal increase of the disease in a whole town or region.

"It is practically impossible," Prof. Chumakov said, "to vaccinate 100% of susceptibles with Salk vaccine for a variety of reasons."

The Council on Drugs of the AMA in the same issue of the journal reiterates its belief in the Salk vaccine and states the live poliovirus vaccine will not be available for use in 1961, although it is being studied.

• Science News Letter, 79:280 May 6, 1961

MEDICINE

Help for Leukemia Seen In New Oral Compound

► EFFECTIVE ORAL treatment of chronic lymphatic leukemia and Hodgkin's disease has been reported.

Uracil mustard, an "alkylating agent," one of the antitumor substances, has produced regression of symptoms in 15 of 20 leukemia patients and in 16 of 27 with malignant lymphoma, or Hodgkin's disease.

Fewer side effects were noted than when nitrogen mustard was injected into the veins of such patients. Large doses were given for short courses at intermittent periods.

Drs. B. J. Kennedy and Athanasios Theologides of the University of Minnesota Medical School, Minneapolis, report in *The New England Journal of Medicine*, 264:790, 1961, that cancer has been controlled by uracil mustard in seven patients for one year.

• Science News Letter, 79:280 May 6, 1961

ASTRONOMY

Two "Exploding" Stars Found in Milky Way

► TWO UNUSUAL "exploding" stars, having atmospheres that move with speeds up to 2,000 miles a second, have been found in the Milky Way.

Both novae, as they are called, were found on photographic plates by Drs. Jason J. Nassau and Charles B. Stephenson, astronomers at Case Institute of Technology in Cleveland.

In about two or three days, a nova can become many thousand times brighter than it was before. It then gradually fades. The increase in brightness is caused by an explosion inside the star. However, both novae are much too faint to be seen without a telescope.

• Science News Letter, 79:280 May 6, 1961

IN SCIENCE

TECHNOLOGY

Cheaper Atomic Power From Hot Gas Tested

► A WAY of producing atomic power much more cheaply is being investigated. The idea is to make the jet of hot gas from an atomic furnace generate electricity directly without having to use rotating machinery like a steam turbine.

A prototype of one of these "no-moving-parts" generators that will test the principles of the method is being built by the Parsons Nuclear Research Center, New-castle-on-Tyne, England.

Prof. M. W. Thring of Sheffield University has carried out some small-scale experiments on generating electricity direct from flames. The prototype is designed to test the possibilities of using this kind of generator with a gas-cooled atomic furnace like the Dragon, now under construction.

The most modern power stations waste about two-thirds of the heat contained in the coal they burn or release in their atomic furnaces. This waste cannot be avoided except by increasing the working temperature of the gas or steam used. But, in spite of many improvements, the maximum temperature at which the steels used for turbine blades can be made to work is quite low.

The new type of generator, because it has no moving parts, can be made of materials able to withstand the high temperatures but not strong enough to be used in a turbine.

• Science News Letter, 79:280 May 6, 1961

ROCKETS AND MISSILES

Atlas Failure Will Not Delay U. S. Space Flight

► THE FAILURE of the Atlas rocket carrying a "mechanical man" will not delay the first U. S. manned space flight.

The National Aeronautics and Space Administration reported that the purpose of the flight had been accomplished, namely to release safely the capsule that the first United States astronaut will ride in.

The Atlas rocket carrying the capsule was launched from Cape Canaveral at 11:15 a.m. Tuesday, April 25, and was destroyed 40 seconds later by the range officer because the rocket malfunctioned.

The space capsule was ejected in the way planned for the end of the flight. It landed in shallow water a short way from the beach and was picked up by a helicopter and returned safely.

The first U. S. manned space flight will get its send-off with a Redstone rocket, not an Atlas. For this reason there will be no reason for any delay in the planned manned flight, believed ready to take place early in May.

• Science News Letter, 79:280 May 6, 1961

THE FIELDS

GENERAL SCIENCE

Spending More for Basic Research Urged

► **MORE MONEY** must be spent on pure science research in the United States space program if the country is to maintain its leadership in that field.

The National Aeronautics and Space Administration budget for pure sciences must be doubled or tripled to keep pace with the many new space developments, Dr. John A. Simpson of the University of Chicago said in Washington, D. C.

The U. S. is facing "lean years" in the space program ahead, the scientist said. Only one probe into deep space and back is scheduled from now until 1963.

In the years ahead, free nations of the world will look back to see who were the leaders in pure science research, which provides the building blocks for future space achievements.

More space probes are needed for sampling space phenomena. Rockets with greater thrust can carry heavier payloads, the scientist said, but a more diversified sampling of space is needed which cannot be accomplished with solitary shots covering a limited area.

The tempo for heavier shots still should be maintained, but the pure science budget should also be greatly increased. Although the United States has "lost the first round in the race to put a man in space," the program should not be de-emphasized, the scientist concluded.

• Science News Letter, 79:281 May 6, 1961

MEDICINE

Medical Research Lags Behind Man in Jet Age

► **MODERN** technological innovations demand a new approach in medical research, Dr. Rene J. Dubos, noted microbiologist and pathologist, said at the Yale School of Medicine.

Dr. Dubos, of the Rockefeller Institute in New York, said the jet age has man moving about so fast that modern medicine has not yet caught up with him.

"Nowadays changes occur constantly and rapidly," he said. "New substances, new forces, new stimuli are constantly introduced in our life and we cannot avoid them."

But most medical research work is geared to a study of man and his ailments as if his life was much slower and constant, the scientist emphasized.

"The interplay between the innate nature of the organism and the environment in which he lives focuses attention on an aspect of modern life which has been neglected by medical science," he said.

"At an ever-increasing rate, man is being separated from the environmental forces

among which he has evolved. He has hardly any occasion to experience the impact of regular seasonal variations. He carries his day into the night and vice versa. He moves by jet in a few hours from one climate and one latitude or longitude to another."

He indicated that these changes along with modern air-conditioning contrasts to the non-conditioned atmosphere and other excessive stimuli may have physiological consequences.

"These problems should and can be investigated," he said, "but they demand a different kind of scientific approach and also a change of emphasis on what is worth doing and fashionable."

Dr. Dubos said "biomedical sciences have emphasized almost exclusively the aspects of life that man shares with animals." Medicine must now develop techniques to study disease and health as affected by the "traits which differentiate man from the rest of creation. Scientists will not feel at home in this new kind of task."

• Science News Letter, 79:281 May 6, 1961

ROCKETS AND MISSILES

Communication Satellites Endorsed by President

► **PRESIDENT KENNEDY** has endorsed a step-up in this country's communications satellite program. An additional "\$25 to \$27 million" will be invested in space communications.

This is an area in which the United States has demonstrated a superior space capability. It has long been thought by experts in international affairs here and abroad that the first nation to make such a system available to the world would have a greater impact on the minds of men than would the nation which orbited man first. Industry has been anxious to share development costs in this area.

President Kennedy indicated that developing such a system was a U. S. space goal. He said he would welcome support in achieving this goal from industry or any others interested in putting their money into this area. He indicated, however, that investment by industry would afford little saving to the Government.

"I must say," he said, "that from examining this and other programs, the Government puts most of the money into it."

The entire area of this country's space science program currently is under review. Decisions will be made in the near future concerning the areas in which U. S. space efforts are to be concentrated. They will be those in which the U. S. can advance first and fastest, the President said.

Although President Kennedy did not mention it, besides communications, the United States has a great lead in space meteorological research from its weather satellites, Tiros I and II. But the Administration's present space budget has cut funds for development in meteorology. These probably will be restored and possibly increased in the near future.

• Science News Letter, 79:281 May 6, 1961

MEDICINE

Human Heart Ailments Simulated in Animals

► **FOR THE FIRST TIME**, scientists have produced, in experimental animals, the blood clots that frequently lead to artery hardening and heart attacks in humans. This gives them the tool needed for testing treatments designed to prevent heart disease.

Drs. Sanford Byers and Meyer Friedman of Mount Zion Hospital and Medical Center, San Francisco, reported to the Federation of American Societies for Experimental Biology in Atlantic City, N. J., that the blood clots can be produced either with a small spiral wire or a plastic trough.

It has long been known that a blood clot may be the immediate cause of a heart attack, Dr. Byers said. But in 1948 it was suggested that blood clots might also be one cause of the artery hardening that precedes a heart attack, and researchers have been trying to verify this experimentally ever since.

In one of the techniques devised by Drs. Byers and Friedman, a spiral wire composed of a metal alloy that acts like a miniature battery is placed in a heart artery. This battery provided tiny electric currents that caused a blood clot to form within three days.

The clot in turn causes an artery hardening, which "exactly simulates" the actual area, called an atherosclerotic plaque, found in the arteries of the human heart after a heart attack.

If a researcher wants an atherosclerotic plaque in a specific size, shape or location, he merely changes the size, shape or location of the wire.

The plastic trough works in the same way, except that the clot forms without benefit of electric currents.

Heart disease conditions can be reproduced so precisely with the new technique that different treatments can now be put to tests of exact comparison.

• Science News Letter, 79:281 May 6, 1961

MEDICINE

"Gun" Device Used For Cancer Detection

► **A CANCER** detecting "gun" that permits earlier diagnosis of throat and lung cancer has been perfected by a Florida physician, Dr. J. Ernest Ayre, medical and scientific director of the Cancer Cytology Foundation of America in New York and Miami.

Finger-pressure on the gun trigger fires a brush out of the tube into the oral cavity where it can be rotated. Laryngeal cells from the vocal cords and bronchogenic cells in the mucous stream from the lungs are caught by the revolving brush.

The cell samples are examined under the microscope to determine the presence or absence of malignant cells.

Cytology tests, using the new gun device, are comparatively painless, require less than five minutes to complete, and can result in the discovery of unsuspected cancer.

• Science News Letter, 79:281 May 6, 1961

GENERAL SCIENCE

Science Threshold Crossed Early

Ninety percent of a group developed interest in science before senior high school. Some were interested before entering first grade, Shirley Moore reports.

► NEARLY ALL of the nation's potential supply of scientists arrive at the threshold of a professional future in science before they have been taught any senior high school science or mathematics. About half of them have started to develop as scientific thinkers and doers by the time they are fifth graders.

Continuing studies of promising student-scientists and further experience in introducing grade schoolers to science have shown the adult world that large numbers of very young scholars take to science as naturally as they wade into an inviting mud puddle.

The younger age group also may produce excellent science projects when they are given a chance. Group projects usually are more successful during the earlier grades, but astonishingly competent work has been accomplished by "loners" whose absorbedly careful investigation is a sort of preview of the attitude characteristic of adult research scientists.

During the current year more and more requests for information and advice on conducting elementary and junior science fairs have been received at National Science Fair-International headquarters at Science Service in Washington, D. C.

Share Work With Others

It appears that, at any age, the completion of a piece of meaningful work generates an understandable yen to share it with other people. So the science fair program continues to spread rapidly from senior to junior high schools, and then through the elementary grades all the way to nursery school.

A cumulative SCIENCE SERVICE study of 1,306 finalists at the annual National Science Fairs reveals some facts that may have far-reaching significance in educational planning and opportunities provided for children by their parents and the community:

Half of this group already had developed their initial interest in science before the close of the first quarter of the fifth grade year.

Ninth grade found almost 90% of these potential scientists oriented toward science—before they had been introduced to senior high school courses in physics, chemistry, biology and mathematics.

Twelve years of age, or seventh grade, is the high point on a bar graph of reported ages of the initial sparking of interest, with about 13% of the total group having started out at this age.

The graph shows that fifth and eighth grades are well seasoned with potential scientists, for 12% of the finalist group

recorded their beginnings at 10 years of age and another 12% at 13.

Almost 10% started to be novice scientists as 14 year olds, probably in ninth grade.

A gradual increase in numbers of beginners is recorded for each age from two through seven, with 14% interested before they entered first grade at six years of age. A sharp jump is evident at eight years old, or third grade.

Two low points in the graph suggested possibly important differences in personal characteristics and/or educational practices at the ages of nine and 11, or fourth and sixth grade.

It is most interesting to note that in a University of Minnesota study, supported under the Cooperative Research Program of the U. S. Office of Education, the development of creativity in children also showed a sharp drop during the fourth grade year. This was followed by a slow recovery on the part of most children during the upper elementary grades, but some seem to have lost their creative talents permanently, reported Dr. E. Paul Torrance of the bureau of educational research at the University of Minnesota.

The corresponding slump during fourth

grade in initial interest in science has been reported to the U. S. Office of Education by SCIENCE SERVICE, and also an additional low point during sixth grade which was not found in the creativity study.

The University group now is investigating the fourth grade drop in creative characteristics and activities in the hope of discovering exact causes. SCIENCE SERVICE will continue its studies also and will attempt to correlate its data with studies of the physical and psychological development of children.

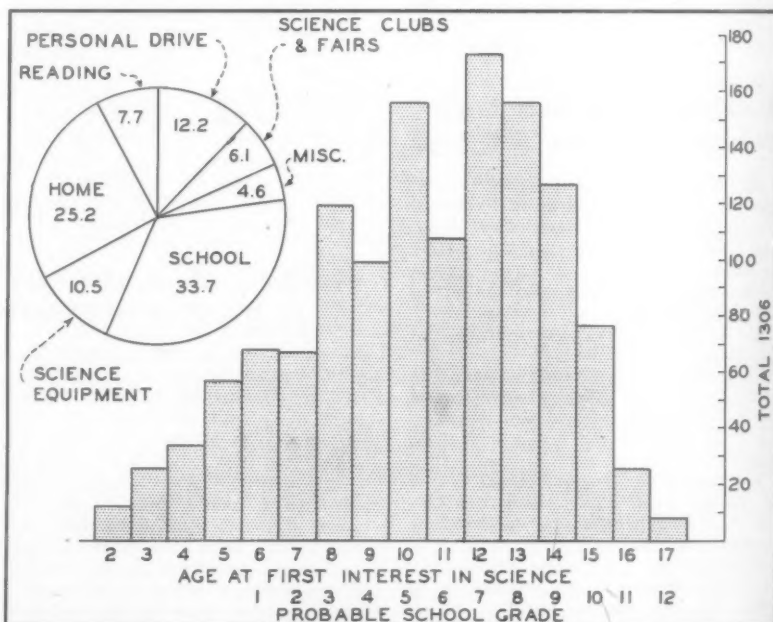
Until more definite answers are found, it may be conjectured that the cause lies in the rebellion against adult authority and the conformity to interests and activities of classmates that the Gesell Institute describes as being characteristically important among nine year olds.

Eleven Is Difficult Age

The Institute has found 11 to be a seething, critical, fiercely competitive, obstreperous age. Possibly the turmoil is too overpowering to allow the blossoming of new intellectual interests and abilities.

On the other hand, some of the fruitful sources of science-mindedness are known. The SCIENCE SERVICE studies of 1,306 outstanding high-school-aged scientists yielded these mainsprings of response to science:

More than one-third, 33.7%, said that school activities, courses, laboratories and teachers were most directly influential.



ORIGINS OF SCIENCE INTEREST—The ages and sources of interest in the sciences are shown in this graph of the results of a SCIENCE SERVICE study of 1,306 finalists at National Science Fairs.

One-fourth, 25.2%, were started at home by their parents or other family members, family activities, attitudes and expeditions.

Various sorts of self-generated drive launched 12.2%, who described irresistible curiosity, imaginative speculation, compelling need to know "why" and similar traits as having been their prime movers.

Science equipment that provided opportunities to explore for themselves captured the interest of 10.5%.

Reading books, magazines, newspapers, scientific journals and papers, advertisements, encyclopedias and textbooks started 7.7%.

PSYCHOLOGY

Factor X of Leadership

► THERE IS a mysterious "factor X" essential for leading men.

Regardless of circumstances, from leadership of an infantry squad in battle, handling a field army, to directing an office project, success depends to a considerable degree on the amount of this factor an individual has. Special traits are required for each kind of leadership, but underlying all is "factor X."

Determination of its nature and distribution is the objective of several psychological research projects now underway that were reported at a conference at the U.S. Naval Academy in Annapolis, Md., by Dr. Luigi Petrucci of the Office of Naval Research, sponsor of the conference.

The old idea that leadership ability was a combination of intelligence, courage and capacity to plan ahead, the "great man" theory of history, no longer can be accepted, as an adequate explanation, Dr. Petrucci said.

All these qualities are important, to dif-

Science clubs and science fairs stimulated 6.1% to want to know more about a specific subject or about science in general.

The final 4.6% reported a miscellany of "first causes" such as museums, national parks, professional laboratories, planetarium programs, television productions, community activities, etc.

Such guideposts as these suggest many different routes that may be made freely accessible to children and young scientists. If they then choose to travel these roads, the destination of some of them may well be the scientific community.

• Science News Letter, 79:282 May 6, 1961

ferent degrees in different situations, he pointed out, but any combination of them still does not define factor X. The brave, intelligent, understanding man still may be a poor leader of other men.

Summation of all these qualities, he said, "still is far smaller than the part contributed by some unknown factor X." The object of contemporary research is exploration of the composition of this factor. Traditional methods and concepts are being systematically applied, but do not promise solution. From somewhere must come new concepts.

"We know some of the characteristics of factor X. First, it is dynamic and organic, it follows principles of growth and development. Second, it is dependent on persons, situations and interactions. It is purposive and dualistically oriented towards tasks and persons.

"A new leadership theory must incorporate the old characteristics as a minimum."

• Science News Letter, 79:283 May 6, 1961

MEDICINE

Cancer Mistaken in X-Ray

► DIAGNOSIS of lung cancer may be difficult or impossible from X-ray pictures alone.

A study of ten different shadow forms lung cancer may take on an X-ray plate was shown at the American Academy of General Practice scientific assembly in Miami Beach, Fla.

Dr. Robert W. Jamplis of the Palo Alto, Calif., Clinic warned in the exhibit that masquerades may take the form of simple pneumonia, tuberculosis, obstructive emphysema such as might be experienced from a peanut becoming lodged in the windpipe, and other diseases. A dark round spot may go unnoticed because it looks like a nickel or a quarter in a shirt pocket.

Correct diagnosis should be made promptly by other methods, Dr. Jamplis reported, because any benign-appearing lesion must be suspect. Early surgery is the best treatment for lung cancer.

The economics of medicine was discussed in a panel on the pros and cons of social security methods of financing medical care.

Dr. John S. DeTar of Milan, Mich., moderator of the panel, told SCIENCE SERVICE that the Academy was in general agreement with the American Medical Association, although probably no official stand will be taken.

"Both the AMA and the AAGP are in favor of the individual doing as much as he can for his own medical care," Dr. DeTar said. "Next, the community, then the state, and as a last resort the Federal Government should step in."

Standing virtually alone in favor of social security methods of financing medical care was Leonard Woodcock of Detroit, Mich., who is vice president of the United Auto Workers.

Representing the American Farm Bureau Federation was Roger Fleming, secretary-treasurer and director of the Washington, D.C., office. The Farm Bureau policies for 1961 are that the "need for medical insurance should be met by expansion of existing private insurance programs without Federal subsidy."

• Science News Letter, 79:283 May 6, 1961

SCIENCE BARGAINS

Order by Stock No.—Send Check or M.O.—
Satisfaction or Money Back!

BE THE FIRST ATOMIC GARDENER IN YOUR NEIGHBORHOOD



Take part in the "anything can happen" planting adventure of the century. Plant atomic energized flower and vegetable seeds—indoors or out. Kits include 8 seed packets—4 energized with gamma rays and 4 untreated. Energized seeds are absolutely safe—completely unpredictable—may produce plants and flowers that are larger, more productive, different shapes, unusual colors—just about anything. Normal plants provide comparison. Vegetables: tomato, corn, lettuce, radish. Flowers: petunia, zinnia, marigold, aster. Complete with charts, pictures, instructions.

Stock No. 70,421-Q Vegetable Kit. \$3.95 Postpd.
Stock No. 70,422-Q Flower Kit. \$3.95 Postpd.

ATTENTION TEACHERS!

Elementary through college! New 96-page CATALOG of useful classroom learning and teaching aids. Science, math, physics, astronomy, biology, etc. Request EDUCATIONAL CATALOG—"Q".

'FISH' WITH A MAGNET

Go Treasure Hunting
on the Bottom



Great idea! Fascinating fun and sometimes tremendously profitable! Tie a line to our 5-lb. Magnet—drop it overboard in bay, river, lake or ocean. "Treasure" haul comes—your "treasure" haul can be outboard motors, anchors, fishing tackle, all kinds of metal valuables. 5-lb. Magnet is war surplus—Alnico V type—terrible bargain. Lifts over 125 lbs. on land—much greater weights under water. Order now and try this new sport.

Stock No. 70,188-Q. 5-lb. Magnet. \$9.95 Postpaid



WHIRLING WONDERS WONDERFUL WORLD OF WHIRLING WHEELS

Here's a new adventure in optical impressions—created by the magical effect of these fascinating, rotating discs. In addition to weird shapes and fantastic "after images" this kit demonstrates "stop motion" stroboscopic principles—"off center" focus and even hypnotism. Kit includes 13 discs, approx. 5" in dia. battery holder, rheostat, small motor mounted on bracket, bulb, socket, plug and complete booklet of instructions and experimental use.

Stock No. 70,414-Q. \$9.95 Postpaid

WOODEN SOLID PUZZLES



12 Different puzzles that will stimulate your ability to think and reason. Here is a fascinating assortment of wood puzzles that will provide hours of pleasure. Twelve different puzzles, animals and geometric forms to take apart and reassemble, give a chance for all the family, young or old, to test skill, patience and, best of all, to stimulate ability to think and reason while having lots of fun. Order yours now.

Stock No. 70,205-Q. \$3.00 Postpaid



BUILD A SOLAR ENERGY FURNACE

A fascinating new field. Build your own Solar Furnace for experimentation—many practical uses. Easy! Inexpensive! Use scrap-wood! We furnish instructions. This sun powered furnace will generate terrific heat—2000° to 3000°. Fuses enamel to metal. Sets paper aflame in seconds. Use our Fresnel Lens—14" diameter—f.f.l. 14".

Stock No. 70,130-Q, Fresnel Lens, \$6.00 Postpaid

FREE CATALOG-Q

144 Pages! Over 1000 Bargains!

America's No. 1 source of supply for Science experimenters, hobbyists. Complete line of Astronomical Telescopes, parts and assembled Telescopes. Also huge selection of lenses, prisms, war surplus optical instruments, parts and accessories—Telescopes, microscopes, binoculars, infrared sniperscopes items for making "Science Fair" projects, math learning and teaching aids. Request Catalog Q.



TEACHERS! Write for Educational Catalog Q-2

EDMUND SCIENTIFIC CO.
BARRINGTON, NEW JERSEY

Books of the Week

For the editorial information of our readers, books received for review are listed. For convenient purchase of any U. S. book in print, send a remittance to cover retail price (postage will be paid) to Book Department, Science Service, 1719 N Street, N.W., Washington 6, D. C.

AFRICAN ENCOUNTER: A Doctor in Nigeria—Robert Collis—*Scribner*, 211 p., photographs, \$4.50. Account of his work with the people of Nigeria, written with warmth and perception by the head of the Pediatric Department at the University College of Ibadan in Nigeria.

AGING IN THE STATE OF WASHINGTON: A Report by the Governor's Council on Aging—William S. Hopkins, Ed.—*Univ. of Wash. Press*, 391 p., \$6. Programs and services currently available to the elderly in the state of Washington, and recommendations for meeting unsolved problems.

AMERICA: Too Young to Die—Alexander P. De Seversky—*McGraw*, 237 p., \$4.95. Major De Seversky's impassioned plea for better weapons of interception.

ANALYTICAL GEOMETRY WITH CALCULUS—Robert C. Yates—*Prentice-Hall*, 247 p., \$7.95. Textbook emphasizing analytic facts and techniques, with calculus introduced and used in a supporting role.

ANCIENT EDUCATION AND TODAY—E. B. Castle—*Penguin*, 218 p., paper, 95¢. Reviews the ideas that contributed to the education of "good men" in ancient Greece, Rome and Palestine.

APPLES OF IMMORTALITY FROM THE CUNA TREE OF LIFE: A Study of the Most Ancient Ceremonial and a Belief that Survived 10,000 Years—Clyde E. Keeler—*Exposition*, 72 p., 32 p. illus., \$3.50. Concerns the Cuna Indian Tribe of San Blas, Panama.

THE ASSINIBOINES: From the Accounts of the Old Ones Told to First Boy (James Larpenre Long)—Michael Stephen Kennedy, Ed.—*Univ. of Okla. Press*, 208 p., illus., by William Steadman, \$5. Records recollections and traditions

of North American Indian tribe whose remnants are now living on two Montana reservations.

BASIC CONCEPTS AND EXPERIMENTS IN MICROBIOLOGY—Delbert E. Schoenhard—*Burgess*, 238 p., illus., paper, \$5.50. Laboratory manual giving equal emphasis to techniques and development of concepts of general bacteriology.

BETTER COLOR SLIDES INDOORS—Fred Bond—*Ziff-Davis*, 104 p., photographs, paper, \$1.95. Basic information for beginner and advanced amateur.

CARE OF THE DOG—Charles Leedham—*Scribner*, 243 p., illus., \$4.95. Primer for the dog owner, on feeding, puppy and adult dog care, first aid, mating and pregnancy, and old dog care.

CAREER OPPORTUNITIES FOR VETERINARIANS IN THE AGRICULTURAL RESEARCH SERVICE—USDA (GPO), 16 p., illus., paper, 15¢.

COLOR VISION: An Enduring Problem in Psychology. Selected Readings—Richard C. Teevan and Robert C. Birney, Eds.—*Van Nostrand*, 214 p., paper, \$1.45. Original source material of experimentation and still ongoing research in the field.

THE COMPLETE BOOK OF CATS—Ann McGovern—*Arco*, 96 p., photographs by Walter Chandoa, \$2.50. Guide to the selection, training and care of six major breeds, charmingly illustrated.

COOPERATION FOR PROGRESS IN LATIN AMERICA: A Statement on National Policy—Research and Policy Committee of the Committee for Economic Development—CED, 56 p., paper, \$1. Examines social and economic bases for progress in the future development of Latin America.

THE DOUBLEDAY PICTORIAL LIBRARY OF NATURE: Earth, Plants, Animals—James Fisher and Sir Julian Huxley, Eds., with Sir Gerald Barry and J. Bronowski—*Doubleday*, 363 p., illus., by Hans Erni, \$9.95. Visually intriguing presentation of facts about living things, of interest to the whole family.

EDUCATION FOR PUBLIC RESPONSIBILITY—C. Scott Fletcher, Ed.—*Norton*, 192 p., \$4.50. Fourteen contributors, among them Margaret Mead and Adlai Stevenson, deal here with education for leadership.

ELEMENTS OF NUCLEAR ENGINEERING—Glenn Murphy—*Wiley*, 213 p., illus., GE chart of nuclides, \$7.50. Presents scope, potentialities and limitations of nuclear engineering at college senior level.

EMOTIONAL PROBLEMS OF THE STUDENT—Graham B. Blaine, Jr., Charles C. McArthur

and others, introd. by Erik H. Erikson—*Appleton*, 254 p., \$4.95. Articles describing psychiatric student problems, by members of the Harvard University Health Service.

ENGINEERING DRAWING AND GEOMETRY—Randolph P. Hoelscher and Clifford H. Springer—*Wiley*, 2nd ed., pagged by sections, illus., \$8.95. Textbook not confined to machine drawing but includes graphical mathematics, map drawing and architectural drawing.

ESSENTIALS OF MATHEMATICS—Russell V. Person—*Wiley*, 646 p., \$7. Introductory textbook stressing practical utility of arithmetic, geometry, algebra, logarithms and trigonometry.

EXPLORATIONS INTO THE NATURE OF THE LIVING CELL—Robert Chambers and Edward L. Chambers—*Harvard Univ. Press*, 252 p., illus., \$8. Discusses in relation to recent advances in cell biology the findings of a lifetime's research focusing attention on the intact living cell.

THE EXPLORATION OF THE COLORADO RIVER AND ITS CANYONS—J. W. Powell—*Dover*, 400 p., illus., paper, \$2. Reprint first published in 1895 under title "Canyons of the Colorado."

FIRST COURSE IN ALGEBRA—Arthur W. Weeks and Jackson B. Adkins—*Ginn*, 534 p., illus., \$4.40. Text for ninth grade, emphasizing structure and deductive nature of algebra.

FISHERIES RESEARCH BOARD OF CANADA: Annual Report, 1959-1960—*Queen's Printer*, 196 p., map, paper, 50¢. Reports on biological and oceanographic Canadian research during fiscal year ended March 31, 1960.

FIVE INDIAN TRIBES OF THE UPPER MISSOURI: Sioux, Arickaras, Assiniboines, Crees and Crows—John C. Ewers, Ed.—*Univ. of Okla. Press*, 217 p., illus., \$4. Based on records of the early fur traders, particularly the manuscript of Edwin Thompson Denig.

FOOD FOR PEOPLE—Sarah R. Riedman, introd. by John Boyd Orr—*Abelard-Schuman*, rev. ed., illus. by Helen Ludwig, \$3. Story of how people learned the facts about nutrition.

FOREIGN AID: Our Tragic Experiment—Thomas S. Loebner—*Norton*, 139 p., \$3.50. Reflections on administration of foreign aid based on the experience of an I.C.A. malaria specialist.

THE FOURTH DIMENSION SIMPLY EXPLAINED: A Collection of Essays Selected from Those Submitted in the Scientific American's Prize Competition—Henry P. Manning, Ed.—*Dover*, 251 p., illus., paper, \$1.35. Unabridged reprint of work first published in 1910.

THE GRASS COVER OF AFRICA—J. M. Rattray—*FAO (Internat'l Documents Service)*, 168 p., paper, map, \$2.50. First of FAO projects of mapping the grazing resources of underdeveloped countries.

HANDBOOK ON ROCK GARDENS—Victor H. Ries, Ed.—*Brooklyn Botanic Garden*, 95 p., illus., paper, \$1. Expert articles on rock garden design, rocks, soil and plants for various regions, on propagation and pest control. Generously illustrated.

HI-FI STEREO KITS—Norman Eisenberg—*Arco*, 126 p., illus., \$2.50. For the do-it-yourself hi-fi builder.

A HOLE IN THE BOTTOM OF THE SEA: The Story of the Mohole Project—Willard Bascom—*Doubleday*, 352 p., illus. by author and Russell F. Peterson, \$4.95. Comprehensive account of the events leading up to and the preparations for the scientific drilling project aimed at probing the composition of the earth's mantle.

HOSPITAL WITH A HEART—Joseph D. Wassersug, M.D.—*Abelard-Schuman*, 160 p., \$3. Discusses various hospital departments for young people interested in career in nursing, medicine, science or social science.

IRE DICTIONARY OF ELECTRONIC TERMS AND SYMBOLS—Compiled from IRE Standards—*Inst. of Radio Engineers*, 225 p., \$10.40. Brings

COMPRESSED TABLETS

(Non-medical) Made to Order

Very small sizes to the very largest. Experimental work undertaken. If you need tablets made, write us for quotations.

R. P. CARGILLE LABORATORIES, INC.

117 Liberty Street New York 6, N. Y.

CRASH!

A tragic ending of your air-line flight could be personally disastrous for you, but financially disastrous to your family.

Newly designed for the professional man, scientist and executive under 65 years of age is the

'55' PLAN

For only \$55 it covers for a full year upon commercial airline flights.

\$100,000 Accidental Death
\$0,000 Maximum Disability Benefits
\$5,000 Maximum Medical Payments

Act today on this special offer.

To: Disability & Casualty Inter-Insurance Exchange, Box 104, Champaign, Illinois

I herewith enclose my premium payment of \$55 for the '55' PLAN to become effective on first day of month following receipt and cover for a full 12 months.

(Type or print)

Name _____
Address _____
Date of birth _____
Beneficiary _____
Signature _____

(Code No.) SNL-61

The Right Way to Play CHESS

A Chess Manual for All, from Beginner to Club Player, by Chess Fundit D. BRINE PRITCHARD, with Introduction and Annotations by International Chess Master IMRE KONIG.

A different method of teaching chess. Discards "archaic" instruction. Explains the game briefly, then plunges directly into play, from which emerges winning theory. "Learn-by-doing." Tells HOW to think about chess, not WHAT to think. Games from the Masters with detailed explanations. "WHY" by Chess Master Imre Konig. Explains the Opening, the Middle game, the End game, and Traps. PROFUSELY ILLUSTRATED. Order now: **THE RIGHT WAY TO PLAY CHESS** \$2.95 Postfree 337 Pages

5-Day Money Back Guarantee
EMERSON BOOKS, Inc., Dept. 282-M
251 West 19 Street, New York 11

together definitions in force in December, 1959, from *absolute delay to zoning (stepping)*, as well as letter symbols and graphical symbols.

AN INTRODUCTION TO THE EXPERIMENTAL METHOD: For Students of Biology and the Health Sciences—J. Maxwell Little—*Burgess*, 84 p., paper, \$3. Elementary introduction to the principles of the experimental method with emphasis on the simpler and most frequently used statistical concepts.

THE LAST FRONTIER: A Short History of Alaska—Ben Adams—*Hill & Wang*, 181 p., illus. by George Abgupuk, \$3.50. Highlights of the history of the forty-ninth state.

MECHANICAL MEASUREMENTS—T. G. Beckwith and N. Lewis Buck—*Addison-Wesley*, 559 p., illus., \$8.75. Introductory textbook on modern measurements problems in development engineering and in the field of automatic control.

THE MIGHTY THOR: Missile in Readiness—Julian Hart—*Duell*, 271 p., photographs, \$4.50. The story of the first operational ballistic missile, the first one to boost a payload into polar orbit.

MODERN FUNDAMENTALS OF ALGEBRA AND TRIGONOMETRY—Henry Sharp, Jr.—*Prentice-Hall*, 340 p., \$8.65. Modern and rigorous treatment of elementary algebra and trigonometry.

MODERN JUNIOR HIGH SCHOOL SCIENCE: A Recommended Sequence of Courses—Abraham S. Fischler—*Teachers College*, 127 p., paper, \$2. Deals with science programs for grades seven, eight and nine, outlining courses in general science as four units of work per year.

ON BEING A PARENT OF A HANDICAPPED CHILD—Benjamin Spock—*Nat. Soc. for Crippled Children and Adults*, 18 p., illus., paper, 25¢ direct to publisher, 2023 W. Ogden Ave., Chicago 12, Ill. Pediatrician's advice to parents.

PORPOISE AND SONAR—Winthrop N. Kellogg—*Univ. of Chicago Press*, 177 p., illus., \$4.50. Describes extensive research program examining the way in which porpoises navigate in the ocean without the use of vision, smell, taste or touch, presenting evidence on the working of echo-ranging or sonar system.

RARE METALS HANDBOOK—Clifford A. Hampel, Ed.—*Reinhold*, 2nd ed., 715 p., illus., \$20. Fully revised, now includes cesium, chromium, plutonium, rubidium, scandium and yttrium. Arranged for speedy reference.

THE REAL BOOK ABOUT ROBOTS AND THINKING MACHINES—Julian May—*Garden City Bks.*, 216 p., illus. by Ray Gooris, \$1.95. Tells boys and girls about history and progress in automation.

ROAD ATLAS: United States, Canada, Mexico—Rand McNally, 112 p., 11 x 15 inches, illus., paper, \$1.95. New up-to-date color maps covering 50 states alphabetically, index gives final 1960 census figures.

SILICONES—S. Fordham, Ed.—*Philosophical Lib.*, 252 p., illus., \$10. On the chemistry of organosilicon compounds with systematic treatment of manufacturing processes and the applications of silicones.

SPIRE: The Story of a Famous Fighter—Bruce Robertson—*Harleyford Pubs. (Aero Publishers)*, 211 p., illus., photographs, \$8.50. Complete history of the many achievements of this British-designed aircraft, famous during World War II.

STATISTICAL SOURCES REVIEW, Vol I, No. 1—Gale, 45 p., paper, monthly, \$20 per year. Monthly survey of newly published sources of current U.S. non-governmental statistical information, including some foreign sources.

A STUDY OF HISTORY, Vol. XII: Reconsiderations—Arnold J. Toynbee—*Oxford Univ. Press*, 740 p., \$10. Historian's "second thoughts" on his earlier ten-volume work, in the light of new research, after visiting a number of Asian and

Latin American countries, and in answer to his critics.

SUNSET FOOD FREEZING CHARTS—Vera Greaves Mrak—*Lane Bk. Co.*, unpagged, paper, 60¢. Charts tell how to prepare and freeze fruits, vegetables, fish, poultry and cooked foods.

SYMPOSIUM ON TECHNICAL DEVELOPMENTS IN THE HANDLING AND UTILIZATION OF WATER AND INDUSTRIAL WASTE WATER—William L. Lamar, Chmn.—*Am. Soc. for Testing Materials*, 92 p., illus., \$3. Among others, papers and discussions on radioactive waste water and on disposal of oil-field brines.

TECHNIQUES IN FLAME PHOTOMETRIC ANALYSIS—N. S. Poluektov, transl. from Russian by C. N. and T. I. Turton—*Consultants*, 219 p., illus., \$9.50. Discussion of basic methods, apparatus, photometric measurement procedure and techniques for determining elements in various materials.

THIS IS THE AIR FORCE ACADEMY—Marian Talmadge and Iris Gilmore, foreword by William S. Stone, Major General, USAF—*Dodd*, 95 p., photographs, \$2.75. Presents life of Academy cadets.

THUNDERBIRDS—Martin Caidin—*Dutton*, 256 p., illus. by Fred L. Wolff, \$4. The story of the USAF jet precision team famous for their split second sky maneuvers at supersonic speeds.

TONY'S BIRDS—Millicent E. Selsam—*Harper*, 64 p., illus. by Kurt Werth, \$1.95. A first grader's book of discovery.

TOURIST MANUAL FOR RUSSIA: A Pocket Guide Book—John E. Felber—*Hammond*, 4th. rev. ed., 192 p., illus., \$1.95. Handy passport-size, full of useful up-to-date information for the traveler.

TREASURES BY THE MILLIONS: The Story of the Smithsonian Institution—Harry Edward Neal—*Messner*, 192 p., photographs, \$3.50. The story behind the collections of a great scientific institution, including the work of many scientists and specialists, told for young people.

TYPE SPECIMENS OF BIRDS IN THE UNITED STATES NATIONAL MUSEUM—Herbert G. Deignan—*U.S. National Mus. (GPO)*, 718 p., paper, \$2.75. The result of 15 years of study of the types of birds preserved in the national collection.

THE UNITY OF THE UNIVERSE—D. W. Sciama—*Doubleday*, 213 p., illus., diagrams by Joan Wedge, paper, 95¢. Cosmology for the layman.

WONDERS OF THE WORLD BETWEEN THE TIDES—Norman Hammond Wakeman—*Dodd*, 63 p., photographs by author, \$2.95. Seashore biology for young and old.

YOUR GARDEN IN THE SOUTH—Hamilton Mason—*Van Nostrand*, 358 p., photographs, \$7.75. Comprehensive garden guide to what you can and cannot grow in different sections of Florida, Alabama, Georgia, Louisiana, Mississippi and eastern Texas.

• Science News Letter, 79:284 May 6, 1961

Questions

MEDICINE—How does a new gun device detect cancer? p. 281.

OCEANOGRAPHY—How is electricity generated in an organic fuel cell? p. 275.

Photographs: Cover, Convair Division of General Dynamics Corporation; p. 275 and 278, U. S. Geological Survey; p. 277, Fireweel Company, Inc.; p. 279, U. S. Navy; p. 282, Science Service; p. 288, Eastman Chemical Products, Inc.

ENGINEERING

National Academy of Engineering Discussed

► A NATIONAL ACADEMY of Engineering is being planned by the leading professional engineering organizations of the nation acting through the Engineers Joint Council in New York.

This new top-level organization with limited membership would either have a separate existence paralleling the National Academy of Sciences, now almost a century old as the most elite such body in the nation, or it would be established as a part of the existing academy with a name change to the National Academy of Sciences and Engineering.

The proposed organization is being discussed by a committee of the Engineers Joint Council an organization of national and regional engineer societies that includes 250,000 engineers in the nation.

• Science News Letter, 79:285 May 6, 1961

ROCKETS AND MISSILES

Weightless Tests Of Rocket Fuels

See Front Cover

► TWO ENGINEERS test a capsule of liquid hydrogen under weightless conditions in an Air Force zero-gravity flight.

The test is part of a study to learn how liquid rocket fuels would behave in outer space, being made for the National Aeronautics and Space Administration by Convair Division of General Dynamics Corporation, San Diego, Calif.

• Science News Letter, 79:285 May 6, 1961

INTRODUCING U.V. to you

LEARN—understand some of its fundamentals. Have fun experimenting with this safe long-wave Ultra-Violet light. Send \$5.00 for a U.V. Bulb (operating directly off the "house lines" 120 V.). 3 different, named, fluorescent mineral specimens each a brilliant actor and instructive literature. All for \$5.00 p.p.



RADIOMETER



American made. Balanced four arm vane, in a 3" diameter evacuated glass globe, turns upon exposure to light, any light, even a lighted match. Highly decorative, interesting, educational, instructive. A conversation piece. We guarantee yours to operate.

\$3.00 p.p. 2 for \$5.00 p.p.



GEM CARBIDE SCRIBER \$1.50 p.p.

Tipped with the hardest metal made by man. Stays sharp 50 times longer than other metals. GEM CARBIDE SCRIBER pencils can engrave on hardened steel, metals, glass, gems, ceramics, plastic, etc. USED BY: jewelers, artists, craftsmen, designers, die cutters, glass cutters, machine shops, laboratories and model builders. FREE pocket clip. FREE instructions. **Genuine Diamond Scriber** \$4.00



12 LEPIDOPTERA

(Butterflies to you)

Imported exotic jungle beauties, dried flat, ready to study, remount or make into many beautiful decorative items. Gorgeously colored, genuine wings, exquisitely shaped by nature; fabulously more colorful than man's best efforts. Artificial bodies. Educational, fascinating for every age. Send \$1.00 at once for 12 different butterflies. **Remit with Order — No C.O.D.**

HARRY ROSS

Scientific & Lab Apparatus
61-L Rensselaer St., N.Y. 7, N.Y.

DRAW Any Person in 1 minute



NO LESSONS! NO TALENT! You Can Draw Your Family, Friends, Anything From REAL LIFE—Like An Artist Even If You CAN'T DRAW A STRAIGHT LINE! ALSO EXCELLENT for All Types of Drawings!
 Human Figures • Outdoor Scenes, landscapes, buildings • Still life, vases, bowls of fruit, lamps, furniture, all objects • Copy photos, other pictures, portraits, etc. • Copy designs, decorations, etc., for workbooks, crocheting, knitting • Anything you want to draw is automatically seen on any sheet of paper thru the "Magic Art Reproducer." Then easily follow the lines of the "picture image" with a pencil for an original "professional looking" drawing.

SEND NO MONEY

Pay postman on delivery \$1.98 plus postage. (Or send only \$1.98 with order and we pay postage. Money Back Guarantee if not satisfied after 10-Day Trial!)

NORTON PRODUCTS
 Dept. 563, 296 Broadway,
 New York City 7

EXPLORE THE SKIES!

COLOR MAP OF THE NORTHERN HEAVENS: 30"x34", shows stars to magnitude 5.1. **\$1.00**
COLOR CHARTS OF THE MOON: 2 maps of 1st- and last-quarter, 23"x33". **\$2.00**
SPLENDORS OF THE SKY: 36-page picture booklet designed for the classroom. **50¢**

Write for free folder N.

Dept. SNP

SKY AND TELESCOPE Cambridge 39, Mass.

GOLD-SILVER-URANIUM



LEARN How to Know and Identify Ores and Minerals. This Prospector's set of 24 Ores and Minerals, including Gold, Silver, Uranium, Copper, Lead, Zinc, Nickel and 17 others—PLUS a 192 page, fully illustrated manual, with easy to follow—step by step instructions; shows you how to identify hundreds of minerals. Complete with magnifying glass—\$4.95

MERRITT MINERALS

2112-L Fort Dearborn St., Dearborn, Michigan

DAZZLE YOUR OPPONENTS WITH CHESS COMBINATIONS!

"Art of Chess Combination" by Znosko-Borovsky, only work teaching principles; acclaimed by champions and beginners alike. Basic ideas, how to interlock pieces, force occasions, etc. 238 pp. \$1.45, 10¢ postage. Money-back guarantee. Dept. SNL, DOVER, 180 Varick St., N. Y. 14, N. Y.

MICRO-ADS

Equipment, supplies and services of special interest to scientists, science teachers and students, science-minded laymen and hobbyists. 25¢ per word, payable in advance. Closing date 8 weeks prior to publication (Saturday).

SNL, 1719 H St., N.W., Washington 6, D. C.

GOVERNMENT SURPLUS RADIOS, RECEIVERS, transmitters, gadgets, parabolic reflectors, infra-red sniperscopes, aircraft camera lenses. Amazing catalog 10¢. John Mesina, Malden 48, Mass.

NATIONAL GEOGRAPHIC MAGAZINES, 1888-1960, any issue. Periodical Service, Box 465-SN, Wilmington, Delaware.

NEW ELECTRIC THERMOMETER—INDICATES temperature remotely to 3000 ft. and up to five locations. Measures temperature of air, liquids, amateur weather men, orchard men, storage men, outside humidity. For students, science teachers. Send for brochure. Electra-Temp. Co., Dept. S, Box 6111, San Diego 6, California.

WANTED: MICROSCOPIC PARTICLES OR PAPER or Chromophyll 5 to 40 microns in size 5 micron increments. Needed by research project. Funds available. Write Murco Research, Inc., P. O. Box 6006, Jacksonville 9, Florida.

BIOLOGY

Hormone-Enzyme Control

► **TWO BIOCHEMISTS** hope they have opened the way to understanding one of the least known biological processes—how enzymes and hormones together control metabolism.

Drs. K. Lemone Yielding and Gordon M. Tomkins of the National Institutes of Health, Bethesda, Md., have shown that a compound similar to the female sex hormones broke down the structure of an enzyme called glutamic dehydrogenase—an enzyme that takes part in the build-up and breakdown of proteins.

Reporting their findings at the annual meeting of the Federation of American Societies for Experimental Biology in Atlantic City, N. J., Drs. Yielding and Tomkins said their work was the first example of such interaction.

The way hormones and enzymes interact is one of the least understood aspects of biology. Some kind of interaction must take place between the two substances if the complex chemistry of the body is to be regulated.

Biochemists say that some 10,000 individual reactions occur in the human being, each under the control of its own special enzyme. Scientists also know that the same reactions are also under the control of different hormones—possibly the thyroid hormone, or any of the sex hormones, or a hormone such as insulin.

But they are less sure what hormones are associated with what reactions. There are fewer hormones than there are enzymes, so one hormone must ultimately affect several reactions, thus several enzymes.

Drs. Yielding and Tomkins studied the ways by which one type of hormone might break up the glutamic dehydrogenase molecule, thus keeping its activity down. They said the shape of the hormone might be a crucial factor.

They worked with a molecule similar in structure to most of the female sex hormones, a compound called o-phenanthrene. On mixing this compound with the long, intact molecule of glutamic dehydrogenase, the enzyme was split into four parts, destroying its effectiveness.

They think that the flat structure of o-phenanthrene "enables this compound to interfere with the forces which hold the enzyme molecule together." So if the body suffers from too much glutamic dehydrogenase the hormone would destroy some of it, restoring the chemical balance.

"Further studies of how this enzyme is altered by such compounds may lead to a better understanding of the manner in which hormones control enzymes," they said.

• Science News Letter, 79:286 May 6, 1961

Insulin-like Substance

► **THE BODY** apparently produces insulin-like substances, even when the pancreas has been removed, two scientists reported at the Federation of American Societies for Ex-

perimental Biology meeting in Atlantic City, N. J.

No one knows what the substances are or where they come from, Dr. Richard H. Eg Dahl and Harold L. Goldberg of the Medical College of Virginia, Richmond, reported.

Experiments show that in dogs from which the pancreas and all other abdominal organs have been removed, something causes artificially-induced high blood sugar levels to decrease and stay at a normal level. Insulin does the same thing in intact animals. But blood tests on these operated animals show that the "something" is not insulin.

These substances with insulin-like activity have kept blood sugars at a normal level for periods up to seven days in operated dogs, but whether they could maintain the pace longer is not known.

• Science News Letter, 79:286 May 6, 1961

Protection Method Found

► **SEROTONIN**, one of the top four drugs that gives some protection against radiation, appears to work by depriving critical blood-forming tissues of oxygen, a University of Chicago research team reported to the Federation of American Societies for Experimental Biology in Atlantic City.

Dr. John Doull and Dr. B. J. Tice of the Radiation Laboratory operated by the University of Chicago for the Air Force, reported that when serotonin, also known as 5-HT, is given to white mice before irradiation, the radiation dose which kills half of the mice within 30 days can be raised from 542 roentgens to 880 roentgens.

They suspected that oxygen deprivation was the mode of action for serotonin and tested their assumption by placing mice in boxes containing 25 times as much oxygen as they would normally receive, then gave them serotonin and a large dose of radiation. If the drug actually protects by reducing oxygen, they reasoned, mice in an oxygen-saturated atmosphere would receive more oxygen and less protection.

The excess oxygen cut the protective effect of the serotonin by 60%. The most important changes were in the spleen, where tissue oxygen levels dropped 80% within five minutes after the drug was given.

The scientists also reported that serotonin, a neuro-hormone found naturally in the brain and the intestines, reduces body temperature when given as a drug, but no relationship has been found between this phenomenon and radiation protection.

Serotonin ranks below aminoethyl isothiourea (AET) and mercaptoethylamine (MEA) and above P-amino-propionophenone (PAPP) in ability to protect against radiation. But none of these drugs are good enough, Dr. Doull said. What is needed, he reported, is something that can provide protection when given after radiation.

• Science News Letter, 79:286 May 6, 1961

Kodak reports on:

19 pages of savvy on schlieren...what can be done with a puree...
special plates, backyard telescopes, and the infrared

Thin air can be photographed

The technique of schlieren photography has now been debased to the point where a man can send in to Kodak for a free booklet on how to do it, can carefully read all 19 pages, and can set himself up as a schlieren man. Yes, and perhaps a case can be made that it is not necessarily immoral to go at it just that way.

Though the schlieren method of photographing refractive index gradients in gases and liquids has been around for quite a while, general literature about it is scant; most of what has been published about it dwells on some particular application. You can find packaged schlieren outfits advertised, but the advertisements are low-pressure. Everybody who is doing schlieren now learned the hard way and is entitled to respect. One such savvy schlieren group works at Battelle Memorial Institute and another at Cornell Aeronautical Laboratory, Inc.



Here is an enchanting display item from Battelle's gallery—a turbulent Bunsen flame, frozen in a 13-microsecond schlieren portrait. Areas lighter than background represent decreasing index in an arbitrary direction within the plane of the picture; darker areas represent change in the opposite direction. To measure the quantitative rate of change with distance demands the very considerable elaboration of interferometric technique. A third method, called shadow photography, delineates the second derivative of refractive index with distance. Our booklet merely hints at the existence of these other methods. Given enough encouragement to expand it some day, we might cover them in useful detail.

To start encouraging us, send for "Schlieren Photography" to Eastman Kodak Company, Special Sensitized Products Division, Rochester 4, N. Y.

Light as air



Millions of Americans now facing a biological problem without significant precedent in all human history may well sit up and take notice of this picture. Theirs is the problem of avoiding more calories than their doctors say are good for them while enjoying the primal delight of good eating to which evolution has attuned the nervous system.

Both beakers contain the same quantity of applesauce. The one on the right contains only two additional ingredients: 1% of *Myverol Distilled Monoglycerides, Type 18-00* and 1000% of air. Both of these added ingredients are recognized by competent authorities to be as harmless as applesauce itself. One adds the monoglyceride, warms, and whips warm or cold. An ordinary kitchen mixer will do. If the result is a bit too airy for the common taste, one can either use more strongly flavored applesauce, freeze while mixing (as in making ice cream), or both. Even unfrozen, the whip is every bit as stiff as it looks in the picture and stays so for several hours. If you want more time, you can dry it down to a powder, package it, ship it to a store, and let a customer whip it after reconstituting with hot water.

It doesn't have to be applesauce, either. We have made the idea work just as well with pears, bananas, peaches, tomato juice, grape juice, and sweet potatoes. We don't see why it wouldn't work with any other strained or pureed fruit or vegetables, or even with puree-like materials for purposes other than food.

We don't sell applesauce or any other purees. We don't even sell *Myverol Distilled Monoglycerides* in family-size quantities. We love to sell them, though, in processor-size quantities and love to talk to processors about them. The address is *Distillation Products Industries, Rochester 3, N. Y.* (Division of Eastman Kodak Company).

Our connections with the heavens

We have three connections with the heavens:

1. Years ago we threw our weight on the side of the angels by a Good Deed. We went to work for the astronomers, a group noted for the slimness of their budgets. We made them the special photographic plates needed for all the projects that have seemed pressing to them, like measuring the angular momentum of galaxies. This work has netted us a medal or two but no wealth. That's all right. Questions about these plates are answered by Eastman Kodak Company, Special Sensitized Products Division, Rochester 4, N. Y. Professional astronomers know that address very well.

2. Amateur astronomers are among the most numerous of scientific-type hobbyists. Many thousands of persons who have to deal all day with tiresome human affairs like to reach out toward the ultimate verities through a backyard telescope. But, being human themselves, they hanker for tangible trophies of the sport. These photography can provide. To guide, we provide a free booklet, "Astrophotography with Your Camera," from the same address the professionals know. The amateur astronomers far outnumber the professionals and buy standard Kodak films at popular prices.

3. A protostar evolving from clouds of dust a million light-years away and an ICBM a thousand miles from the U. S. border have a certain resemblance in the infrared. At Ohio State University we have some astronomers working for us on an astronomical job which lack of suitable equipment has long delayed—preparation of an atlas of infrared emitters on the celestial sphere to 13.5 microns. We made them the missing equipment. We need the atlas. We have our reasons. The equipment includes a drift-free homodyne amplifier which takes a signal from our liquid-helium-cooled copper-doped germanium detector on the 69-inch Perkins Observatory telescope. It can crank down to a .0011 cycle/sec scanning bandwidth so that in 20 minutes it can distinguish the emission of a single star from intergalactic infrared noise. Those who have need and funds for such up-to-date infrared systems should get in touch with Eastman Kodak Company, Apparatus and Optical Division, Rochester 4, N. Y.

Kodak
TRADE MARK

This is another advertisement where Eastman Kodak Company probes at random for mutual interests and occasionally a little revenue from those whose work has something to do with science

• New Ideas and Gadgets •

For sources of more information on new things described, send a self-addressed stamped envelope to SCIENCE NEWS LETTER, 1719 N St., N.W., Washington 6, D. C., and ask for Gadget Bulletin 1090. To receive this Gadget Bulletin without special request each week, remit \$1.50 for one year's subscription.

HANGING WINDOW PLANTER holds six jardinières in two horizontal rows and can be mounted atop lower half of sash window. Planter will fit any window that is not less than 19 inches wide and 21 inches in height and is available in non-tarnish brass or black finish. Each jardinière holds standard three-inch pot with plant.

• Science News Letter, 79:288 May 6, 1961

SUNGLASSES FOR DOODLERS have ball-point pen temple pieces. The plastic-framed, unbreakable lens glasses stay in place even when pens are removed for writing.

• Science News Letter, 79:288 May 6, 1961

SHATTERPROOF LIGHT BULB consists of a glass shape wound with glass fiber yarn and bonded into a single unit with a silicone adhesive. The new incandescent lamp can be dropped onto a hard surface without shattering, and while in use, and hot, can be dipped into ice water without breaking. The glareless bulb, available in standard sizes, lasts three times longer than conventional lamps.

• Science News Letter, 79:288 May 6, 1961

PLASTIC WORLD GLOBE, shown in the photograph, reproduces the earth's surface in three dimensions, helping students to visualize the topography of various regions and to associate place names with surrounding topographical features. The



globe has a tough, transparent outer sphere that can be marked for study and cleaned with a damp cloth. It is mounted over a black ocean globe that has a world map printed on it.

• Science News Letter, 79:288 May 6, 1961

NONFLAMMABLE SOLVENT for cleaning electric motors, ball bearings, magnetic film, electronic devices, gyroscopes and precision instruments, does fast, efficient cleaning job with no harm to insula-

tion or plastic parts. Available for first time in small containers, it is especially useful for cleaning model railroad engines, switches and track, and model auto and airplane parts.

• Science News Letter, 79:288 May 6, 1961

TOOL SET for electronic kit builders includes long-nosed pliers, diagonal side-cutter, adjustable wirestripper, 40-watt soldering iron, two screwdrivers, enclosed in a transparent plastic storage case. Set weighs only three pounds.

• Science News Letter, 79:288 May 6, 1961

SILENT ALARM CLOCK awakens a person by flashing a light instead of ringing alarm. The electric timepiece, at the time set, flashes a light on and off for five minutes. After five minutes, a ringing alarm sounds off, as an emergency precaution. The clock is offered to consumers on a 14-day trial basis.

• Science News Letter, 79:288 May 6, 1961

IDENTIFICATION TAGS, with 3/16-inch white raised letters embossed on 1/2-inch plastic adhesive tape, will stick to all surfaces indefinitely. For indoor or outdoor use, tapes are available in black, brown, red, blue or green, and are applied merely by removing backing and pressing firmly on object.

• Science News Letter, 79:288 May 6, 1961



Nature Ramblings



► **APRIL SHOWERS** bring forth May flowers, and they also bring forth May mushrooms. The warm, wet spring weather permits the rapid swelling of the mushroom "buttons" concealed underground, and sets forth on the woodland show-counter an array to tempt epicures, if they have the lore to know the good and reject the bad.

There is no simple, rule-of-thumb test to tell the difference between edible and poisonous mushrooms. ("Mushroom" and "toadstool," by the way, are merely different names for the same thing.) The silver spoon will not do it, nor the peeling of the cap, nor the color of the underside. You simply have to know your mushrooms.

Of all the inedible mushrooms in this country, there is only one genus that is really deadly; the others are just "tummy-achers"—distressful if incautiously eaten, but of little comfort to the undertaker. The deadly ones, belonging to the genus *Amanita*, or death-cups, are easily distinguished.

Alone of all our mushrooms, a death-cup is marked by a cup at the base of the stalk,

Mushrooms



and a ring—a loose ring—around the stem up under the cap. Many other mushrooms have the ring, and a few the cup, but none except the death-cup have both.

Other things also aid in distinguishing the dangerous genus from the edible mushrooms of the genus *Agaricus*. Death-cups usually grow in the woods, while the common agarics, which resemble them in general appearance but have no cups, grow mostly in the open fields.

The death-cups are white or pallid underneath, while the agaric is black or brown in the gills when ripe, though while "green" it is also white beneath.

• Science News Letter, 79:288 May 6, 1961

Do You Know?

The average size of a farm has climbed to 302.4 acres for the country, an increase of 60 acres since 1954.

Scientific tests indicate that persons who are very independent in making judgments are more intelligent than those who continually agree with a group.

Basic scientific research has more than doubled in the U.S. since 1953.

United States forest industries planted trees on nearly 500,000 acres during the most recent planting season.

The first U.S. electric power plant tapping natural steam energy from the earth's bowels was built in California in 1960.

Fast-moving changes in farm production and marketing are intensifying the need for scientific research in agriculture.

One out of every ten persons in the U.S. has some form of allergy.

• Science News Letter, 79:288 May 6, 1961

